

Integrated Active Learning Framework for Biomedical BD2K

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The proposed project will create active and adaptive open online resources for students and educators. We propose the development of two massive open online courses (MOOCs) for Biomedical Big Data (BBD). BBD for Bioinformaticians will be aimed at bioinformatics students who know some introductory programming and need specialized tutorials focusing on BBD analysis. BBD for Biologists will provide biologists having no previous exposure to programming with the skills required to effectively apply existing software tools in BBD. These MOOCs will have three different adaptive learning tracks that will help guide readers through the courses based on their computational experience. Creating such an adaptive environment would not be possible without our substantial experience in offering the first bioinformatics MOOC, Bioinformatics Algorithms, in fall 2013 on Coursera. By making our learning materials open for use by individual learners and professors, we hope to bring down resource barriers that have prevented BBD courses from growing at individual universities. We will also develop two new problem tracks on our online Rosalind platform that facilitates independent learning of bioinformatics through automatically tested challenges. One of these problem sets will focus on implementing the algorithms required for BBD analysis; the second problem set will focus on applying existing online tools to analyze BBD. By creating a comprehensive set of assessments, we will eliminate the need for BBD professors to ever again think about automating their own homework assignments. Combined with the efforts of our open, adaptive learning environment, these problem sets will help reduce the barriers to creation of new BBD courses at universities. We will foster an open community of BBD educators by forming the BBD Education Alliance. This network will be founded at the RECOMB Conference on Bioinformatics Education at UCSD in 2015, which will focus on BBD education. Members in the alliance will create open learning modules to supplement our content as well as provide feedback to other members of the alliance on their modules. These educators will also work to design BBD courses at their own universities. Finally, PUBLIC HEALTH RELEVANCE: Big Data to Knowledge initiatives at NIH cannot succeed without educating students, researchers, and clinicians in how to analyze Biomedical Big Data (BBD). This project will create active and adaptive open online resources for students and educators by developing two massive open online courses (MOOCs) for BBD. BBD for Bioinformaticians will be aimed at bioinformatics students who know some introductory programming and need specialized tutorials focusing on BBD analysis. BBD for Biologists will provide biologists having no previous exposure to programming with the skills required to effectively apply existing software tools in BBD. We will also develop two new problem tracks on our online Rosalind platform that facilitates independent learning of bioinformatics through automatically tested challenges. Finally, we will foster an open community of BBD educators by forming the BBD Education Alliance, with the goal of developing a vast set of open learning modules for BBD.